

What is claimed is:

1. A driving apparatus of a light-emitting device for driving an light-emitting device to generate an optical pulse signal based on a transmission pulse signal comprising:

a light-receiving device for receiving monitoring light emitted from the light-emitting device and outputting a light-receiving current signal;

a current-to-voltage conversion section for converting the light-receiving current signal to a voltage signal;

an AC coupling amplifier section for amplifying an AC component of a voltage signal output from the current-to-voltage conversion section and outputting an AC amplified signal;

a differential output section for amplifying the AC amplified signal and outputting a positive phase voltage signal and a negative phase voltage signal;

a first detecting circuit for detecting a peak value or a bottom value of the positive phase voltage signal and outputting a voltage depending on the peak value or the bottom value;

a second detecting circuit for detecting a peak value or a bottom value of the negative phase voltage signal and outputting a voltage depending on the peak value or the bottom value of the negative phase voltage signal;

a first reference voltage circuit for generating a first reference voltage;

a first calculation section for adding an output voltage

of the first detecting circuit and an output voltage of the second detecting circuit, and for outputting a voltage depending on a difference between a result of the adding and the first reference voltage;

a first DC current output section for outputting a first DC current depending on a calculation result of the first calculation section;

a pulse current output section for converting the first DC current to a pulse current depending on the transmission pulse signal so as to supply the pulse current to the light-emitting device; and

a bias current output section for supplying a bias current to the light-emitting device.

2. A driving apparatus of a light-emitting device for driving an light-emitting device to generate an optical pulse signal based on a transmission pulse signal comprising:

a light-receiving device for receiving monitoring light emitted from the light-emitting device and outputting a light-receiving current signal;

a current-to-voltage conversion section for converting the light-receiving current signal to a voltage signal;

an AC coupling amplifier section for amplifying an AC component of a voltage signal output from the current-to-voltage conversion section and outputting an AC amplified signal;

a differential output section for amplifying the AC amplified signal and outputting a positive phase voltage

signal and a negative phase voltage signal;

a first detecting circuit for detecting a peak value or a bottom value of the positive phase voltage signal and outputting a voltage depending on the peak value or the bottom value;

a second detecting circuit for detecting a peak value or a bottom value of the negative phase voltage signal and outputting a voltage depending on the peak value or the bottom value of the negative phase voltage signal;

a first reference voltage circuit for generating a first reference voltage;

a first calculation section for adding an output voltage of the first detecting circuit and an output voltage of the second detecting circuit, and for outputting a voltage depending on a difference between a result of the adding and the first reference voltage;

a bias current output section for supplying a bias current depending on a calculation result of the first calculation section to the light-emitting device; and

a pulse current output section for supplying a pulse current depending on the transmission pulse signal to the light-emitting device.

3. A driving apparatus of a light-emitting device for driving an light-emitting device to generate an optical pulse signal based on a transmission pulse signal comprising:

a light-receiving device for receiving monitoring light emitted from the light-emitting device and outputting a

light-receiving current signal;

a current-to-voltage conversion section for converting the light-receiving current signal to a voltage signal;

a differential output amplifier section for amplifying a voltage signal output from the current-to-voltage conversion section, and for outputting a positive phase voltage signal and a negative phase voltage signal;

a first detecting circuit for detecting a peak value or a bottom value of the positive phase voltage signal and outputting a voltage depending on the peak value or the bottom value;

a second detecting circuit for detecting a peak value or a bottom value of the negative phase voltage signal and outputting a voltage depending on the peak value or the bottom value of the negative phase voltage signal;

a first reference voltage circuit for generating a first reference voltage;

a first calculation section for adding an output voltage of the first detecting circuit and an output voltage of the second detecting circuit, and for outputting a voltage depending on a difference between a result of the adding and the first reference voltage;

a second reference voltage circuit for generating a second reference voltage;

a second calculation section for outputting a voltage depending on a difference between an output voltage of the first detecting circuit or an output voltage of the second

detecting circuit and the second reference voltage;

a first DC current output section for outputting a first DC current depending on a calculation result of the first calculation section;

a pulse current output section for converting the first DC current to a pulse current depending on the transmission pulse signal so as to supply the pulse current to the light-emitting device; and

a bias current output section for supplying a bias current depending on a calculation result of the second calculation section to the light-emitting device.

4. A driving apparatus of a light-emitting device for driving an light-emitting device to generate an optical pulse signal based on a transmission pulse signal comprising:

a light-receiving device for receiving monitoring light emitted from the light-emitting device and outputting a light-receiving current signal;

a current-to-voltage conversion section for converting the light-receiving current signal to a voltage signal;

a third reference voltage circuit for generating a third reference voltage;

a differential input differential output amplifier section for amplifying an electrical potential difference between a voltage signal output from the current-to-voltage conversion section and the third reference voltage so as to output a positive phase voltage signal and a negative phase voltage signal;

a first detecting circuit for detecting a peak value or a bottom value of the positive phase voltage signal and outputting a voltage depending on the peak value or the bottom value;

a second detecting circuit for detecting a peak value or a bottom value of the negative phase voltage signal and outputting a voltage depending on the peak value or the bottom value of the negative phase voltage signal;

a first reference voltage circuit for generating a first reference voltage;

a first calculation section for adding an output voltage of the first detecting circuit and an output voltage of the second detecting circuit, and for outputting a voltage depending on a difference between a result of the adding and the first reference voltage;

a first DC current output section for outputting a first DC current depending on a calculation result of the first calculation section;

a pulse current output section for converting the first DC current to a pulse current depending on the transmission pulse signal so as to supply the pulse current to the light-emitting device; and

a bias current output section for supplying a bias current to the light-emitting device.

5. A driving apparatus of a light-emitting device for driving an light-emitting device to generate an optical pulse signal based on a transmission pulse signal comprising:

a light-receiving device for receiving monitoring light emitted from the light-emitting device and outputting a light-receiving current signal;

a current-to-voltage conversion section for converting the light-receiving current signal to a voltage signal;

a third reference voltage circuit for generating a third reference voltage;

a differential input differential output amplifier section for amplifying an electrical potential difference between a voltage signal output from the current-to-voltage conversion section and the third reference voltage so as to output a positive phase voltage signal and a negative phase voltage signal;

a first detecting circuit for detecting a peak value or a bottom value of the positive phase voltage signal and outputting a voltage depending on the peak value or the bottom value;

a second detecting circuit for detecting a peak value or a bottom value of the negative phase voltage signal and outputting a voltage depending on the peak value or the bottom value of the negative phase voltage signal;

a first reference voltage circuit for generating a first reference voltage;

a first calculation section for adding an output voltage of the first detecting circuit and an output voltage of the second detecting circuit, and for outputting a voltage depending on a difference between a result of the adding and

the first reference voltage;

a bias current output section for supplying a bias current depending on a calculation result of the first calculation section to the light-emitting device; and

a pulse current output section for supplying a pulse current depending on the transmission pulse signal to the light-emitting device.

6. A driving apparatus of a light-emitting device for driving an light-emitting device to generate an optical pulse signal based on a transmission pulse signal comprising:

a light-receiving device for receiving monitoring light emitted from the light-emitting device and outputting a light-receiving current signal;

a current-to-voltage conversion section for converting the light-receiving current signal to a voltage signal;

a third reference voltage circuit for generating a third reference voltage;

a differential input differential output amplifier section having two input terminals, a positive phase output terminal and a negative phase output terminal, for receiving a voltage signal output from the current-to-voltage conversion section at one of the two input terminals and receiving the third reference voltage at the other input terminal, and for outputting a positive phase voltage signal from the positive phase output terminal and outputting a negative phase voltage signal from the negative phase output terminal;



a first detecting circuit for detecting a peak value or a bottom value of the positive phase voltage signal and outputting a voltage depending on the peak value or the bottom value;

a second detecting circuit for detecting a peak value or a bottom value of the negative phase voltage signal and outputting a voltage depending on the peak value or the bottom value of the negative phase voltage signal;

a first reference voltage circuit for generating a first reference voltage;

a first calculation section for adding an output voltage of the first detecting circuit and an output voltage of the second detecting circuit, and for outputting a voltage depending on a difference between a result of the adding and the first reference voltage;

a second reference voltage circuit for generating a second reference voltage;

a second calculation section for outputting a voltage depending on a difference between an output voltage of the first detecting circuit or an output voltage of the second detecting circuit and the second reference voltage;

a first DC current output section for outputting a first DC current depending on a calculation result of the first calculation section;

a pulse current output section for converting the first DC current to a pulse current depending on the transmission pulse signal so as to supply the pulse current to the

light-emitting device; and

a bias current output section for supplying a bias current depending on a calculation result of the second calculation section to the light-emitting device.

7. The driving apparatus of a light-emitting device according to claim 4, wherein the third reference voltage is adjusted to an electrical potential of a voltage signal output from the current-to-voltage conversion section when no light is emitted from the light-emitting device.

8. The driving apparatus of a light-emitting device according to claim 1, wherein the first calculation section includes a first time constant circuit.

9. The driving apparatus of a light-emitting device according to claim 3, wherein the first calculation section includes a first time constant circuit and the second calculation section includes a second time constant circuit.

10. The driving apparatus of a light-emitting device according to claim 1 further including a second bias current output section for supplying a second bias current to the light-emitting device.

11. The driving apparatus of a light-emitting device according to claim 1, wherein a gain of the AC coupling amplifier section is adjustable from external.

12. The driving apparatus of a light-emitting device according to claim 3, wherein a gain of the differential output amplifier section is adjustable from external.

13. The driving apparatus of a light-emitting device

according to claim 4, wherein a gain of the differential input differential output amplifier section is adjustable from external.

14. The driving apparatus of a light-emitting device according to claim 1 further including a first detecting section for determining whether the calculation result of the first calculation section exceeds a predetermined value.

15. The driving apparatus of a light-emitting device according to claim 1 further including a second detecting section for determining whether a value of the first DC current exceeds a predetermined value.

16. The driving apparatus of a light-emitting device according to claim 1 further including a third detecting section for determining whether a value of the bias current exceeds a predetermined value.

17. The driving apparatus of a light-emitting device according to claim 3 further including a fourth detecting section for determining whether the calculation result of the second calculation section exceeds a predetermined value.

18. The driving apparatus of a light-emitting device according to claim 1 further including a fifth detecting section for determining whether a summation of currents flowing through the pulse current output section and the bias current output section exceeds a predetermined value.

19. The driving apparatus of a light-emitting device according to claim 1, wherein the light-emitting device is used for transmitting a burst signal.

20. A driving apparatus of a light-emitting device for driving an light-emitting device to generate an optical pulse signal based on a transmission pulse signal comprising:

light-receiving means for receiving monitoring light emitted from the light-emitting device and outputting a light-receiving current signal;

current-to-voltage conversion means for converting the light-receiving current signal to a voltage signal;

AC coupling amplifier means for amplifying an AC component of a voltage signal output from the current-to-voltage conversion means and outputting an AC amplified signal;

differential output means for amplifying the AC amplified signal and outputting a positive phase voltage signal and a negative phase voltage signal;

first detecting means for detecting a peak value or a bottom value of the positive phase voltage signal and outputting a voltage depending on the peak value or the bottom value;

second detecting means for detecting a peak value or a bottom value of the negative phase voltage signal and outputting a voltage depending on the peak value or the bottom value of the negative phase voltage signal;

first reference voltage means for generating a first reference voltage;

first calculation means for adding an output voltage of the first detecting means and an output voltage of the second

detecting means, and for outputting a voltage depending on a difference between a result of the adding and the first reference voltage;

first DC current output means for outputting a first DC current depending on a calculation result of the first calculation means;

pulse current output means for converting the first DC current to a pulse current depending on the transmission pulse signal so as to supply the pulse current to the light-emitting device; and

bias current output means for supplying a bias current to the light-emitting device.